

Argo National Data Management Report – Italy (2019) - MedArgo

1. Status

- **Data acquired from floats:** more than 64000 CTD Argo profiles were acquired in the Mediterranean and in Black Seas between 2001 and September 2019. The temporal and spatial distribution of these profiles is depicted in Figure 1, sorted by the two main float models currently used (BGC-Argo and Core-Argo floats); the monthly and yearly distribution is shown in Figure 2. Note that here BGC-Argo includes the floats with any biogeochemical sensor on board. About 80 floats per months have been operated simultaneously in the basins in 2019 and more than 8500 CTD profiles have been acquired (from September 2018 to September 2019) by different float models (Figure 3).

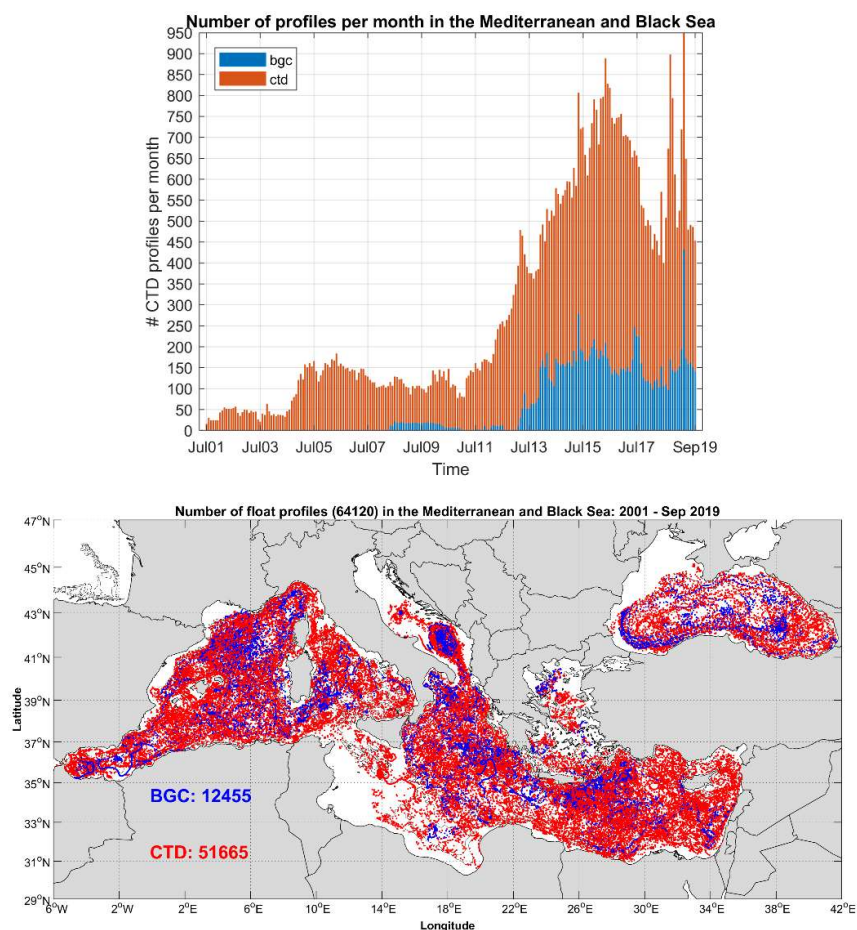


Figure 1. Temporal (upper panel) and spatial (bottom panel) distribution of float profiles in the Mediterranean and Black Sea between 2001 and 2019.

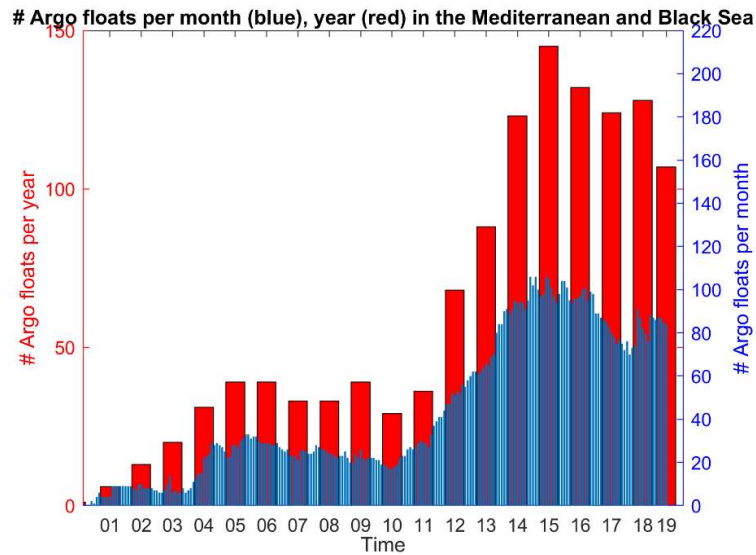


Figure 2. Monthly (blue bars) and yearly (red bars) distribution of Argo floats in the Mediterranean and Black Sea between 2001 and 2019.

The number of CTD profiles acquired by BGC-Argo floats in the last year (September 2018-September 2019) is about 2200 (main contributors: France, Italy and Greece) whilst the ones collected by the core Argo floats are about 6300. Spain, Greece, France and Italy contributed to maintain/increase the Argo population in 2019: a total of 43 new floats have been deployed both in the Mediterranean and in the Black Seas (Figure 3); 20 out of 43 platforms are equipped with biogeochemical sensors and the deployment strategy was chosen according to project's targets and to replace dead floats or under-sampled areas.

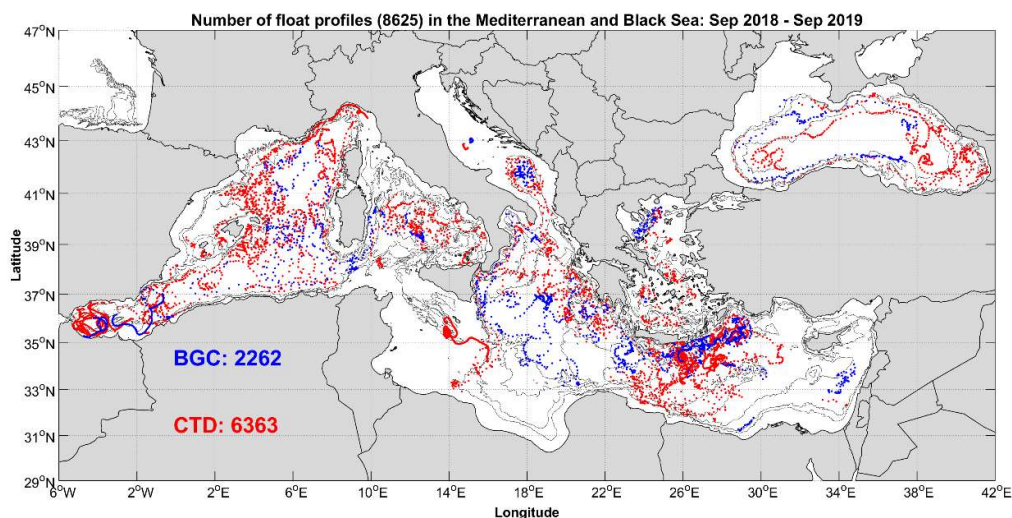


Figure 3. Spatial distribution of profiles collected by Argo floats in the last year (September 2018-September 2019) in the Mediterranean and Black Sea: BGC-Argo floats (blue dots) and standard Argo floats (red dots).

Statistics of the float survival rate in the Mediterranean Sea were computed, using the entire dataset. The survival rate diagram produced are separated by transmission mode (figure 4). The maximum operating life is more than 430 cycles, whilst the mean half life is about 130 cycles (figure 4a). The vertical distance travelled by floats is computed and used as an indicator of the profiler performance (figure 4b). The maximal distance observed is about 430 km, whilst the mean distance travelled is about 105 km.

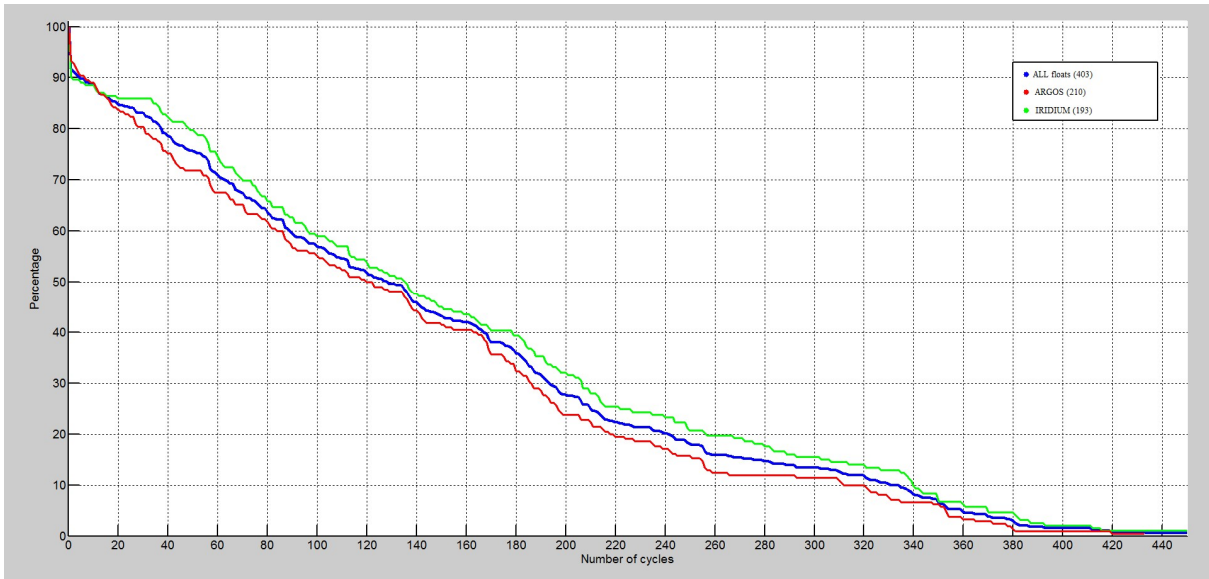


Figure 4a. Survival rate diagrams separated by telemetry system.

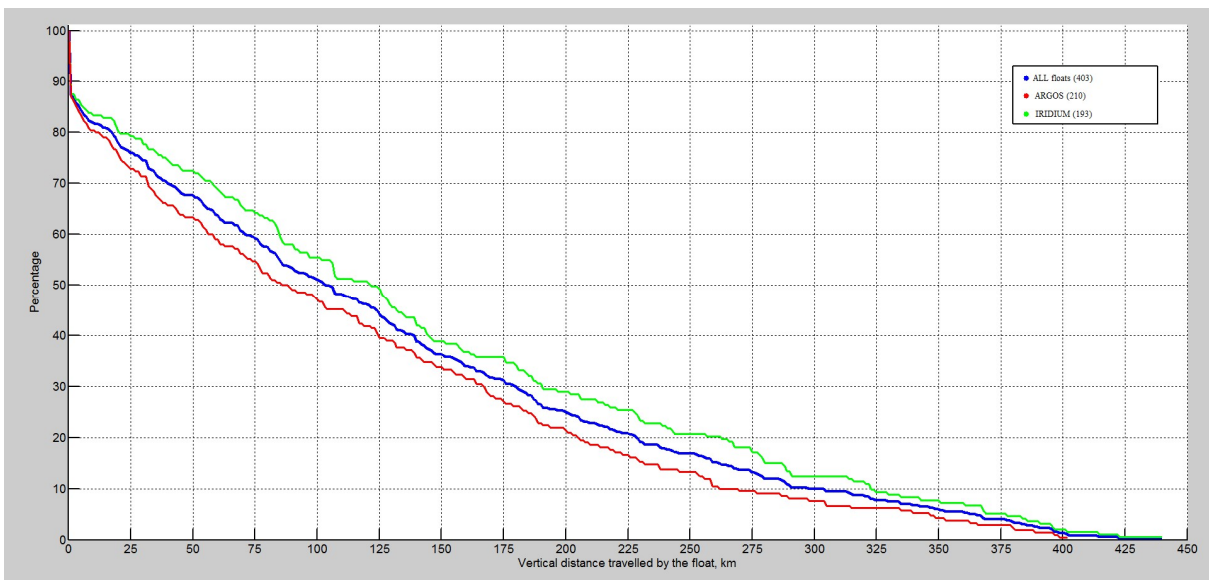


Figure 4b. Diagram of the vertical distance travelled floats, separated by telemetry system.

- **Web pages:**

The OGS MAOS group web site <http://maos.inogs.it> provides detailed information of the Argo-Italy floats (Figure 5).

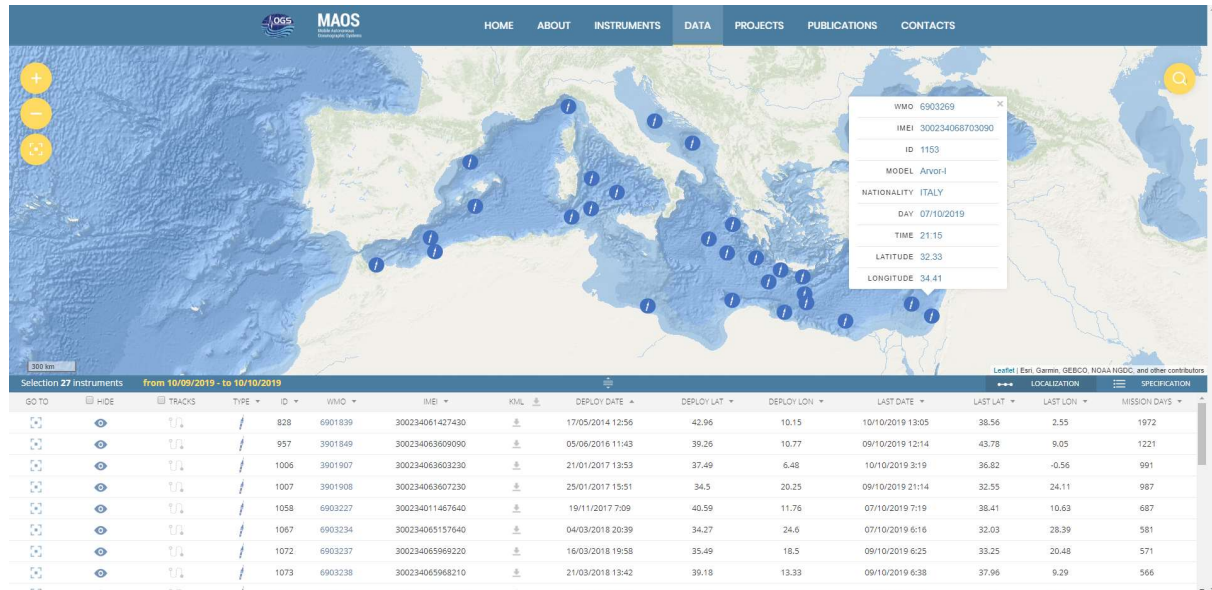


Figure 5. Mediterranean Argo-Italy floats web page

In the MedArgo web page (<http://nettuno.ogs.trieste.it/sire/medargo/active/index.php>) tables and graphics are updated in near real time. The floats deployed during 2019 have been added to the web page as soon as the technical information are available. The float positions are plotted daily (Figure 6); the monthly and the whole trajectories are also provided. Links with the GDAC center (Coriolis) are also available for downloading both the real-time and delayed-mode float profiles. A link with the Laboratoire d'Océanographie de Villefranche (OAO - Oceanographic Autonomous Observations) can provide detailed information about Argo floats equipped with biogeochemical sensors.

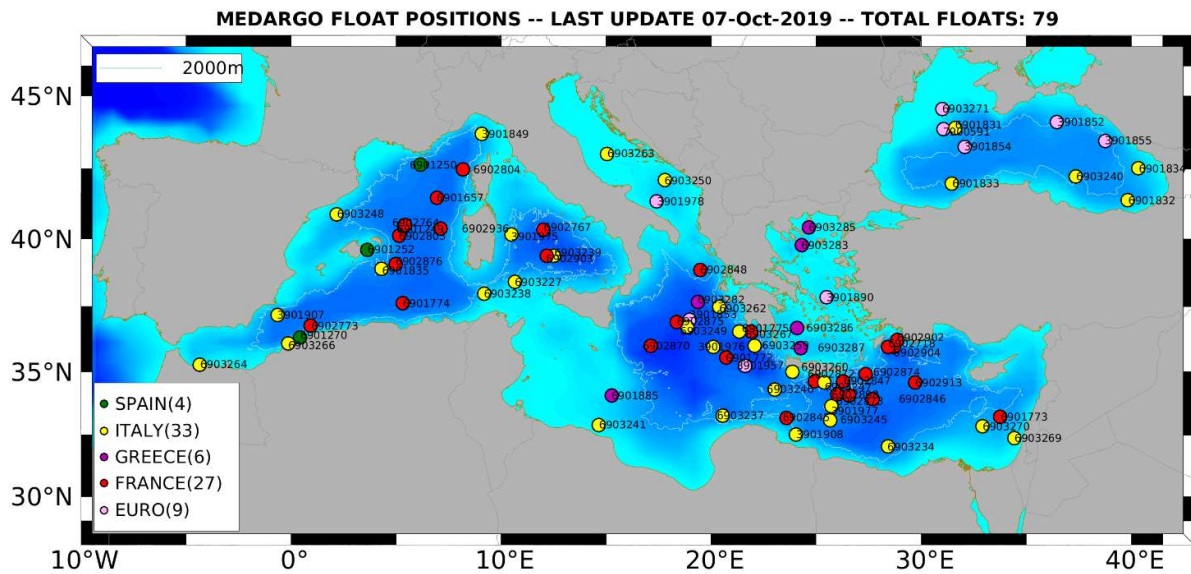


Figure 6. MedArgo float positions as of 7 October 2019 (updated daily).

- **Statistics of Argo data usage:** (operational models, scientific applications, number of National Pis...):
- **Products generated from Argo data:**
 - a. Daily maps of float positions (Figure 6)
 - b. Monthly maps of float positions and track
 - c. Float data are assimilated in numerical forecasting models by INGV (MFS); daily and weekly maps of Mediterranean ocean forecasting system are produced (Figure 7).

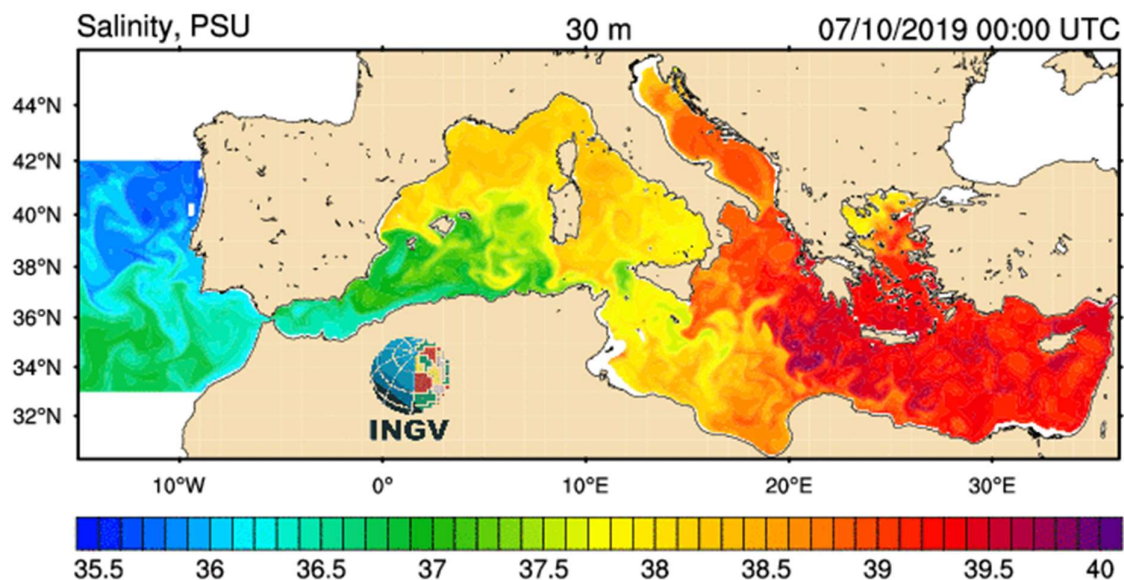


Figure 7. Forecasting model of salinity at 30 meters.

2. Delayed Mode QC

OGS performed the DMQC activity for the Argo data in the Mediterranean and Black Seas. The OW method in conjunction with other procedures is adopted to conduct the quality control analysis for the salinity data.

- Additional and most recent Argo and CTD reference datasets for the Mediterranean and the Black Seas have been added to the current reference dataset. The CTD reference dataset consists of data collected from personal contacts, the CMEMS portal and data provided by Coriolis. The activity is summarized in a report written under the European MOCCA project: *Notarstefano G. (2019). Report on the reference dataset for the delayed-mode quality control activity in the Mediterranean and Black Sea. Deliverables D4.4.1. MOCCA project. European Maritime and Fisheries Fund (EMFF). Agreement number: EASME/EMFF/2015/1.2.1.1/SI2.709624.*
- Since a manufacturing problem linked to the SeaBird Scientific CTD has been highlighted, a list of the floats, that could be potentially affected by a salinity drift caused by the CTDs with the serial number in the range of 6000-7100, was created (Action 31, a doc file was provided separately).
- The DMQC method has been applied to about 67% (as of October 2019) of the eligible floats deployed between 2001 and mid 2018 in the Mediterranean and Black Seas: they were quality controlled in delayed-mode for salinity, temperature and surface pressure and the respective D-files are gradually sent to GDAC. The DMQC report/info of each float can be downloaded by the MedArgo web page (http://nettuno.ogs.trieste.it/sire/medargo/all/table_out_all.php).

3. Regional Centre Functions

- MedArgo is the Argo Regional Centre for the Mediterranean and the Black Sea. OGS, who coordinates the MedArgo activities, established several collaborations with European and non-European countries in order to set the planning and the deployment coordination of floats. Hence, a good coverage is maintained throughout the years. As part of these cooperations the float data are transferred in near real time to MedArgo and 43 new floats have been deployed in the Mediterranean and

Black Sea during 2019, through a coordinated activity of deployment opportunities and thanks to scientific projects.

- The fourth Arvor Deep was deployed in the Hellenic trench on 19th July 2019. It was set to cycle every 2 days and the parking depth equal to the maximal profiling depth (3000 dbar). The vertical resolution was set at 2 dbar in the upper layer (0-100 dbar), 10 dbar in the intermediate layer (100-700 dbar) and 25 dbar in the deep one. The grounding mode is set to "0" that means the float goes up 100 dbar after grounding and wait there before starting its ascent. As soon as the float received a new mission configuration (5 days cycle and 3500 m as the maximal profiling and drifting depth) it stopped transmitting at cycle 6. This issue is still under investigation by the NKE experts.
- There are 69 active Argo floats in the Mediterranean Sea and 10 in the Black Sea as of 7 October 2019.
- A DMQC training activity started in 2019 as an activity planned under the European MOCCA project. A potential new Black Sea DM operator from the IO-BAS Bulgarian Institute is currently trained by OGS.